参考資料

LPC1768-Xplorer

Fig.1

参考資料

About NGX Technologies

NGX Technologies is a premier supplier of development tools for the ARM7, ARM Cortex M0, M3 and M4 series of microcontrollers. NGX provides innovative and cost effective design solutions for embedded systems. We specialize in ARM MCU portfolio, which includes ARM7, Cortex-M0, M3 & M4 microcontrollers. Our experience with developing evaluation platforms for NXP controller enables us to provide solutions with shortened development time thereby ensuring reduced time to market and lower development costs for our customers. Our cost effective and feature rich development tool offering, serves as a testimony for our expertise, cost effectiveness and quality.

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参考資料

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1.0 INTRODUCTION

This document is the User Manual for the LPC-1768-Xplorer, a low cost ARM Cortex-M3 based board by NGX Technologies. This document reflects its contents which include system setup, debugging, and software components. This document provides detailed information on the overall design and usage of the board from a systems perspective.

Before proceeding further please refer the quick start guide for LPC-1768-Xplorer features and hardware verification.

For LPC1768-Xplorer Quick Start Guide: Click here.

For the most updated information on the LPC-1768-Xplorer board please refer to NGX'website.

2.0 LPC1768-Xplorer Development Tool Setup

2.1 IDE and debugger

As mentioned in the earlier section, NGX's MCU evaluation platforms are not coupled tightly with any one particular combination of IDE and debugger. The following sections will explain the setup for LPCXpresso and NXP LPC-Link as the IDE and debugger respectively.

2.2 Installation & Configuration of LPCXpresso software

For installation and configuration of LPCXpresso: Click here.

*Note: We have used **LPCXpresso version 4.2.2_275** while creating the User manual for this evaluation kit. Please ensure that you are using **LPCXpresso version 4.2.2_275 or** above.*

2.3 Setup for NXP LPC-Link and LPC1768 Xplorer Board

The Xplorer board has on board 10 pin SWD/JTAG box, the 10 pin cable is not a part of the LPC1768 Xplorer package, the user needs to buy 10 pin cable separately.

To run the LPCXpresso examples you will need the following and the image shows the each components:

- NXP LPC-Link
- 10 pin cable
- LPC1768 Xplorer Board
- One USB AM to Micro B cable

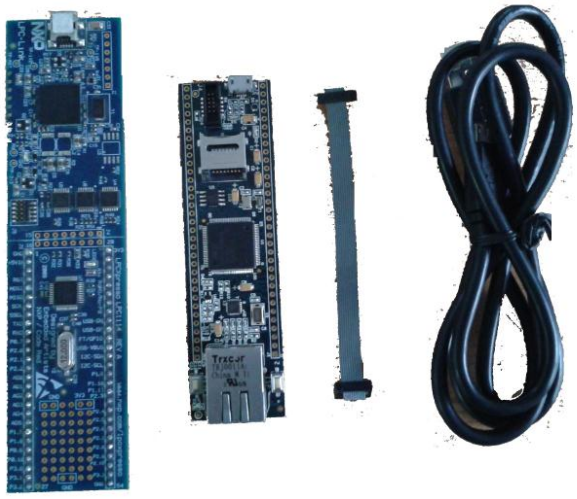

Fig.2

Steps to setup the LPC-Link and LPC1768 Xplorer Board:
(Note: Please refer keil knowledgebase article for connecting 10-pin ribbon cable to NGX Xplorer)

Step 1: Connect one end of 10-pin ribbon cable to 'LPCLink 10-pin connector'; the 10-pin ribbon cable

header notch should facing towards the 'NXP LPCLink Mark' as shown in the following image.

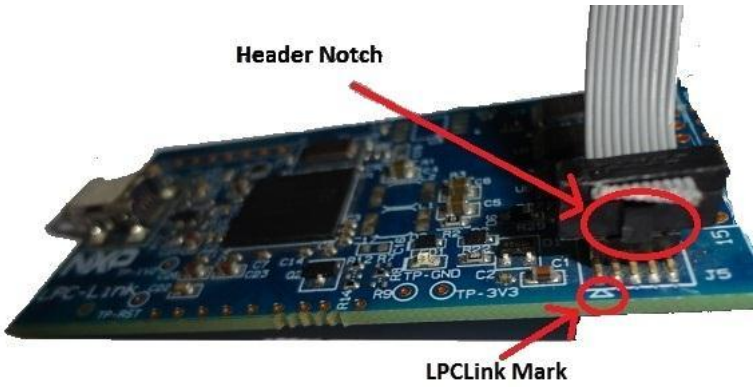

Fig.3

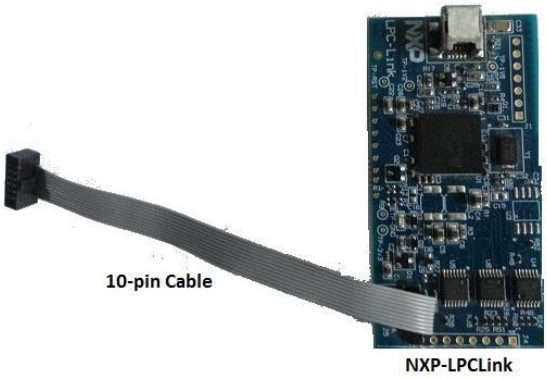

Fig.4

Step 2: Connect other end of 10-pin ribbon cable to '10-pin box header' of the LPC1768 Xplorer board and connect one end of 'USB AM to Micro B' cable to LPC1768 Xplorer board and other end to computer, connect one end of 'USB type mini B' to LPC-Link and other end to computer.

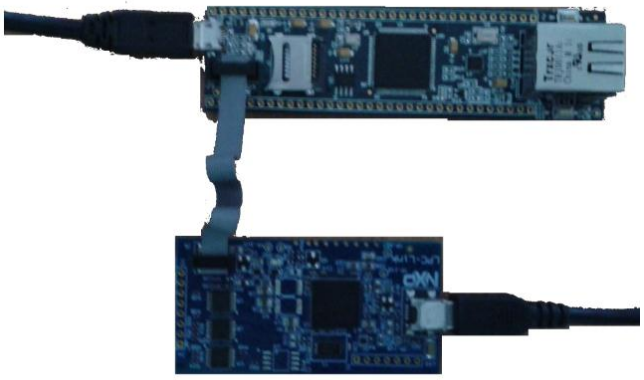

Fig.5

Step 4: The setup is now ready to be used for development with **LPCXpresso** and **NXP LPCLink**.

3.0 LPC1768 Xplorer firmware Development

3.1 Executing the sample projects in LPCXpresso

Please note that the sample programs are available once the product is registered.

Steps to execute the sample project:

1. Open LPCXpresso, Browse the folder which contains **LPC1768_Xplorer_LPCXpresso.zip** project and Click Ok.

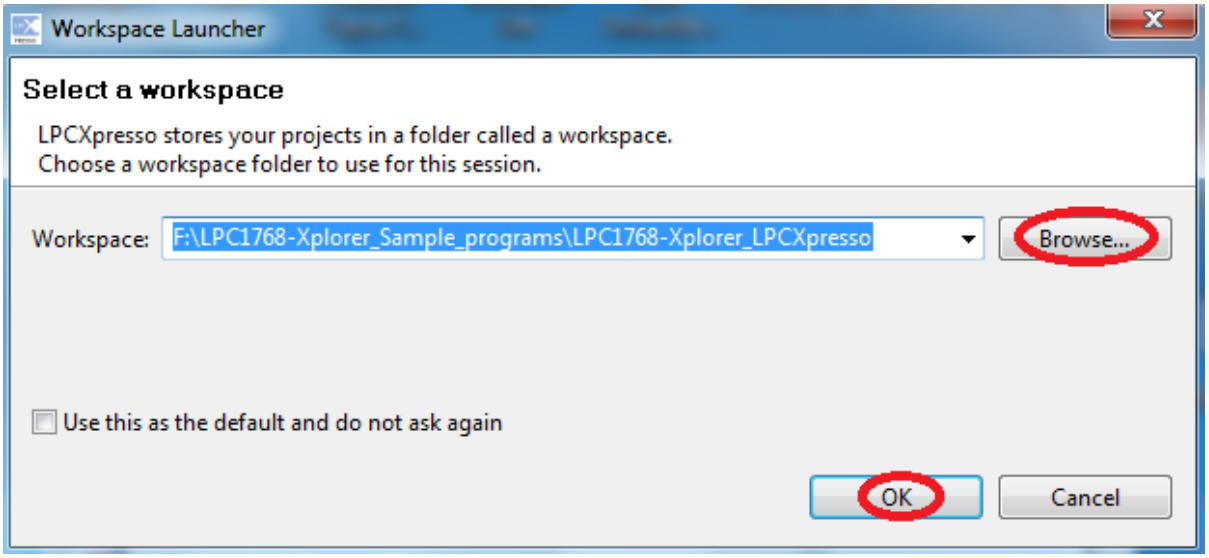

Fig.6

2. Click on Import and Export then Click on Import archived projects (zip).

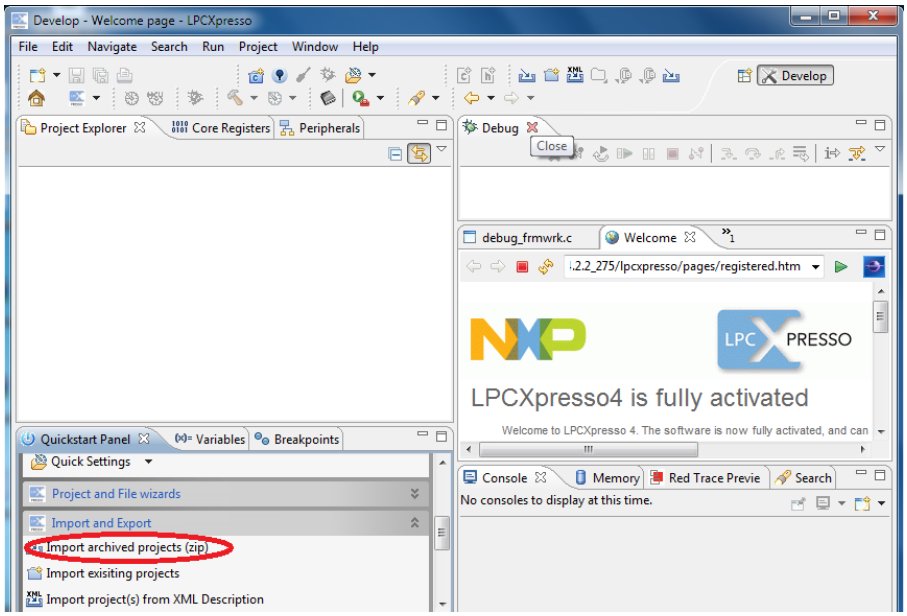

Fig.7

3. Click on Browse to select a archived project (zip) and Click on Open

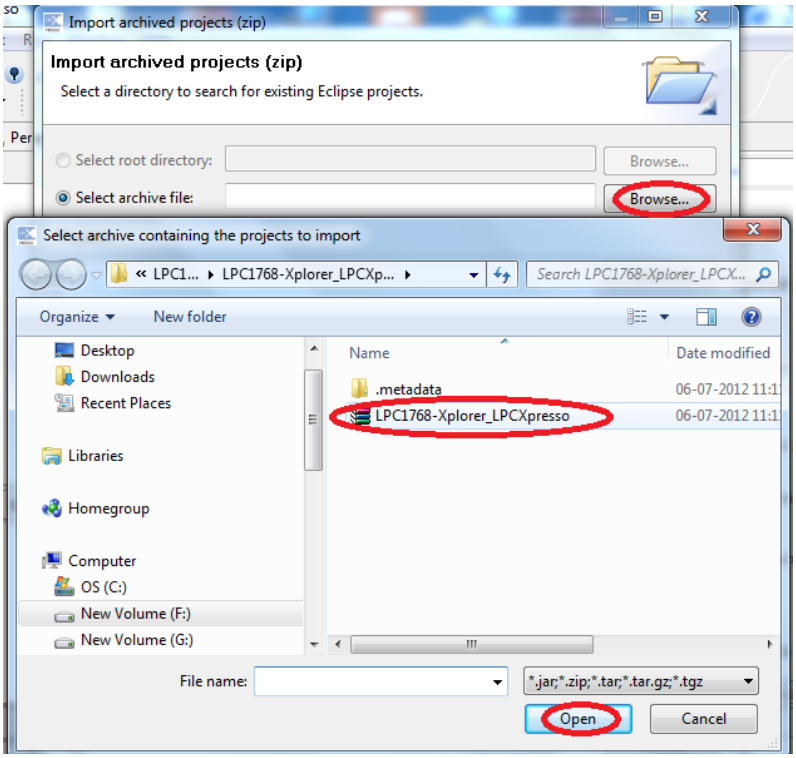

Fig.8

4. Click Finish.

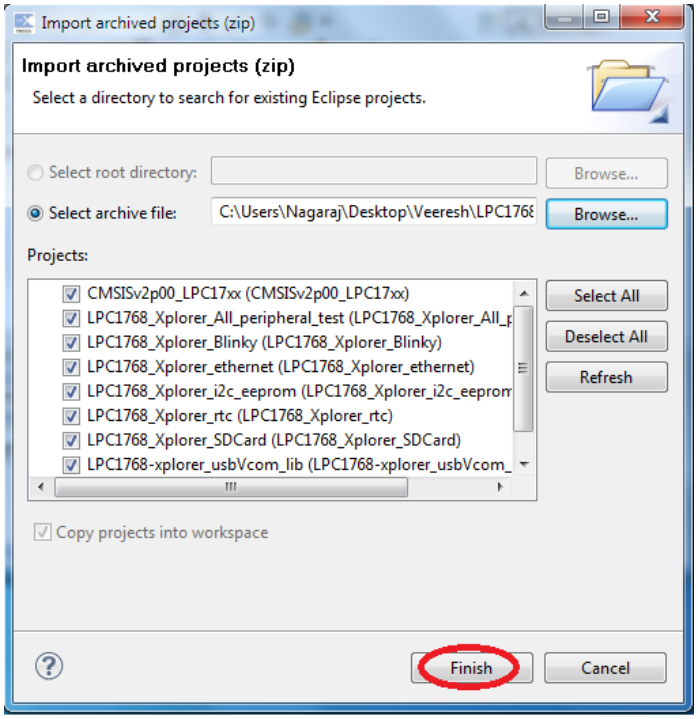

Fig.9

5. Right click on “LPC1768_Xplorer_Blinky” and left click on Build Project.

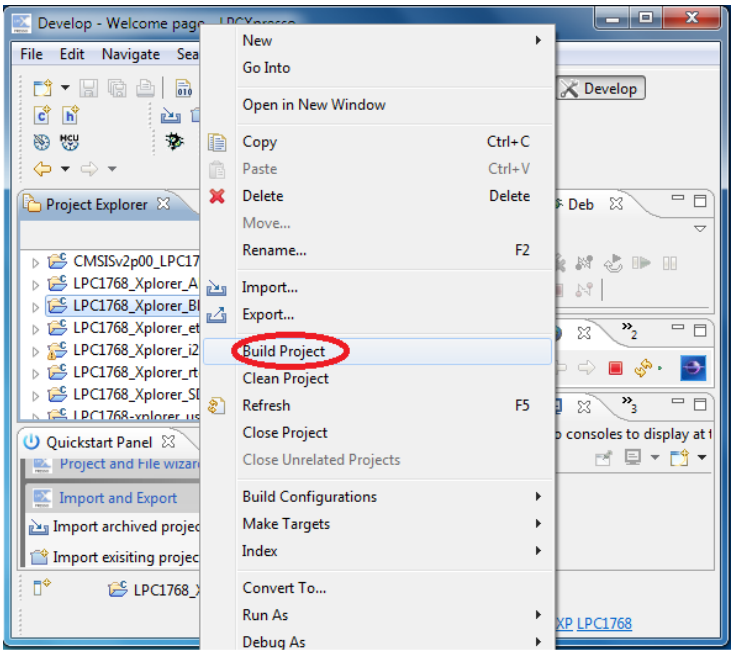

Fig.10

6. For selecting a debug option, right click on LPC1768_Xplorer_Blinky project, go to Lunch Configurations then select Open Current Launch Configurations.

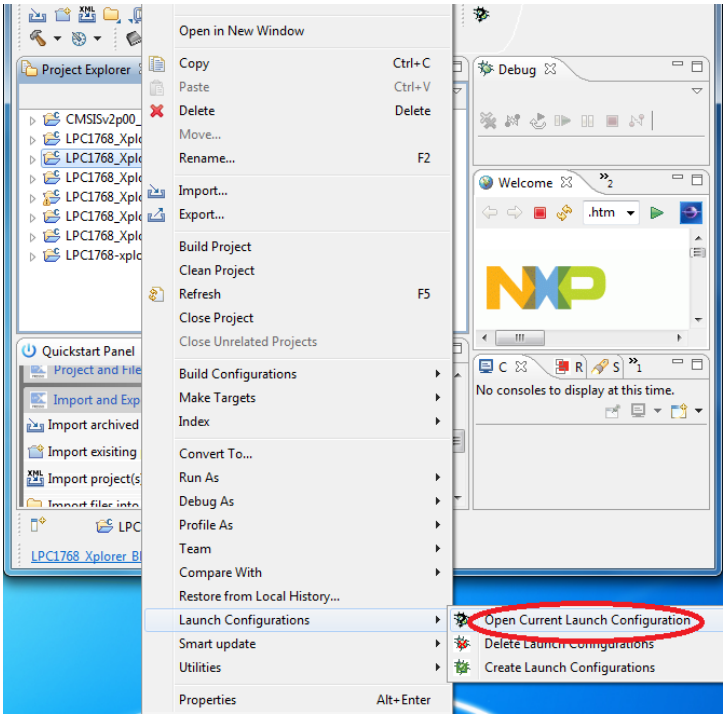

Fig.11

7. Select LPC1768_Xplorer_Blinky Debug then select Debugger and select NXP LPC17xx option and click on Apply.

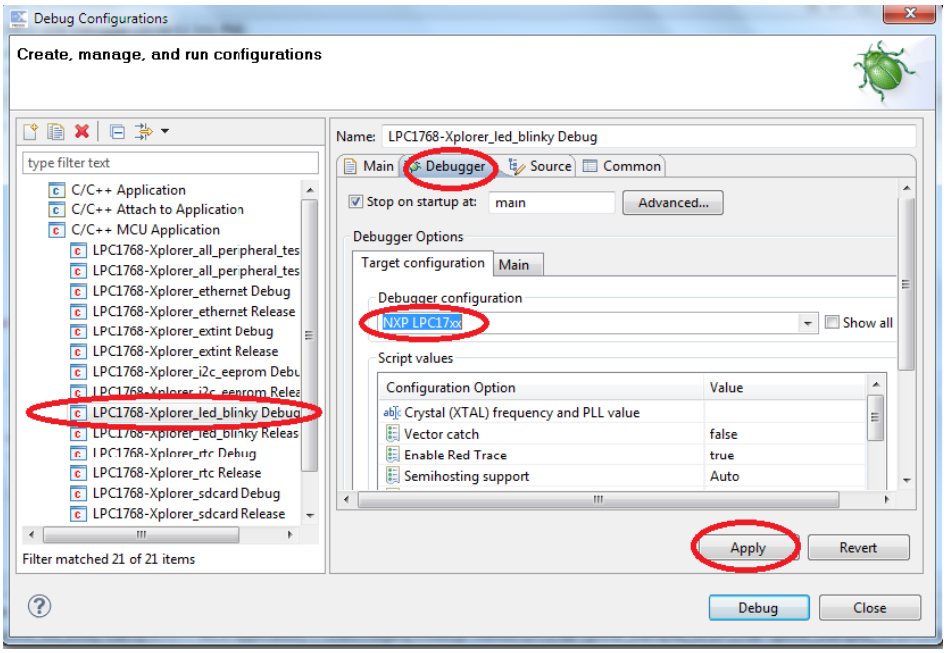

Fig.12

8. After building project click on Debug.

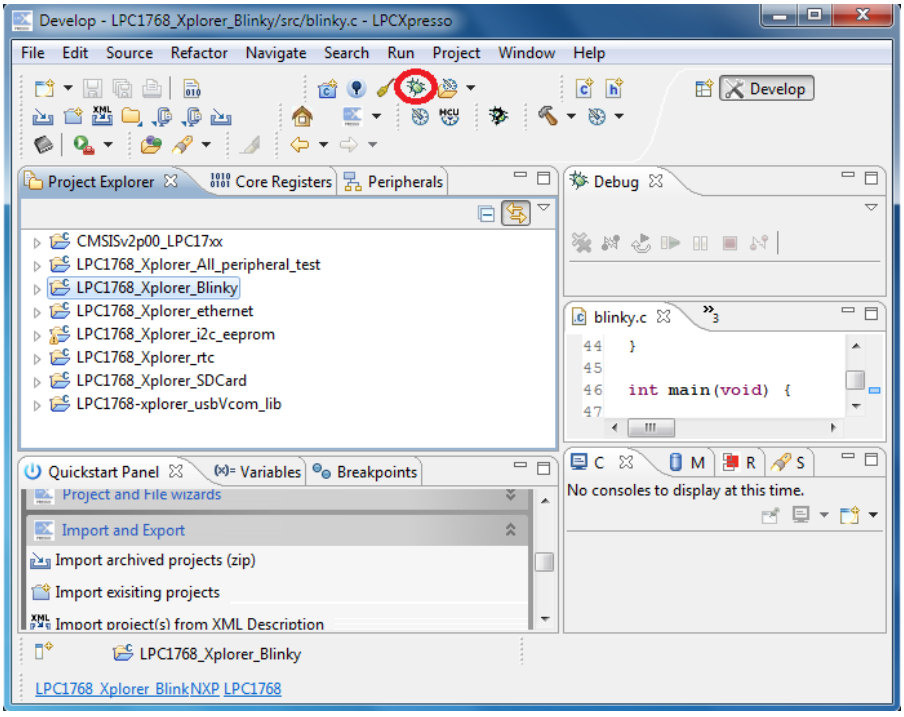

Fig.13

9. Click on Run and select Resume (F8) to start debugging the project. Here the two LED (D4) start blinking.

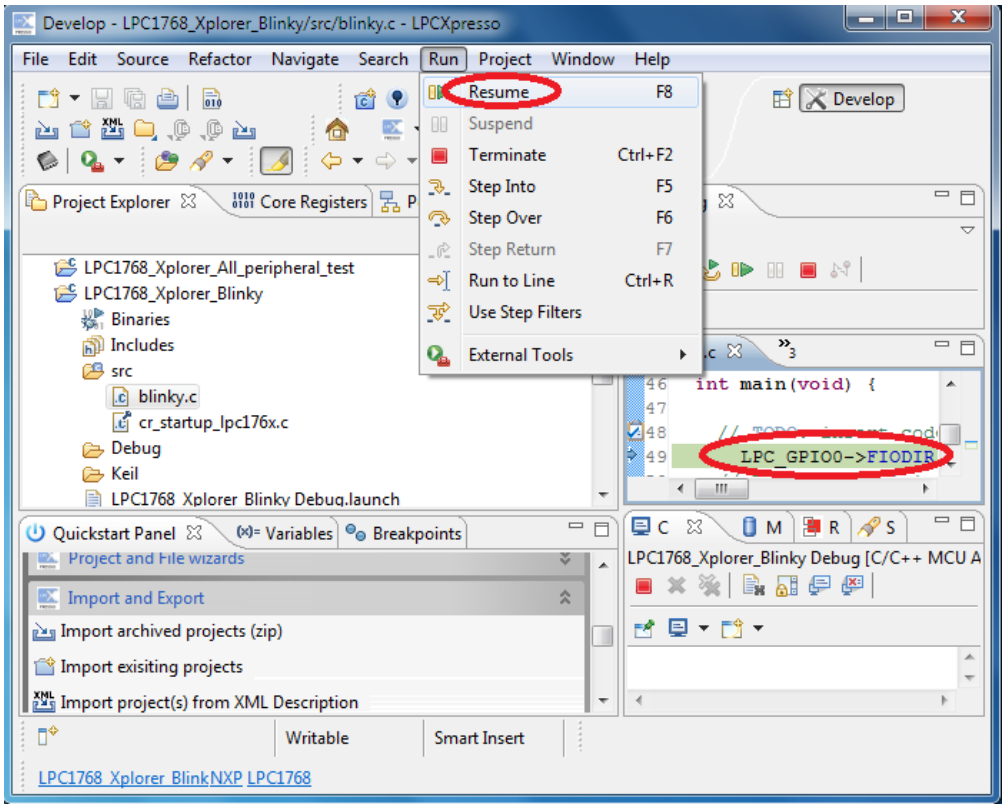

Fig.14

3.2 Creating the sample Blinky project in LPCXpresso

Step 1: Open an LPCXpresso v4.2.2_275 IDE.

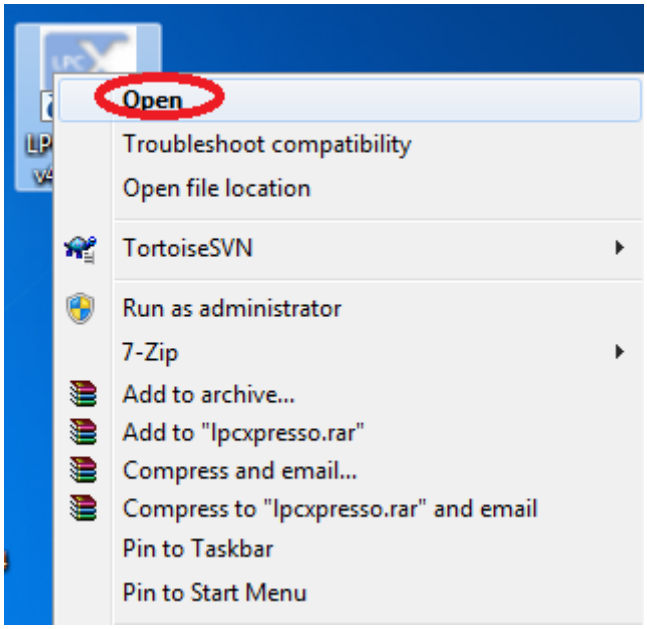

Fig.15

Step 2: Click Browse.. as show below.

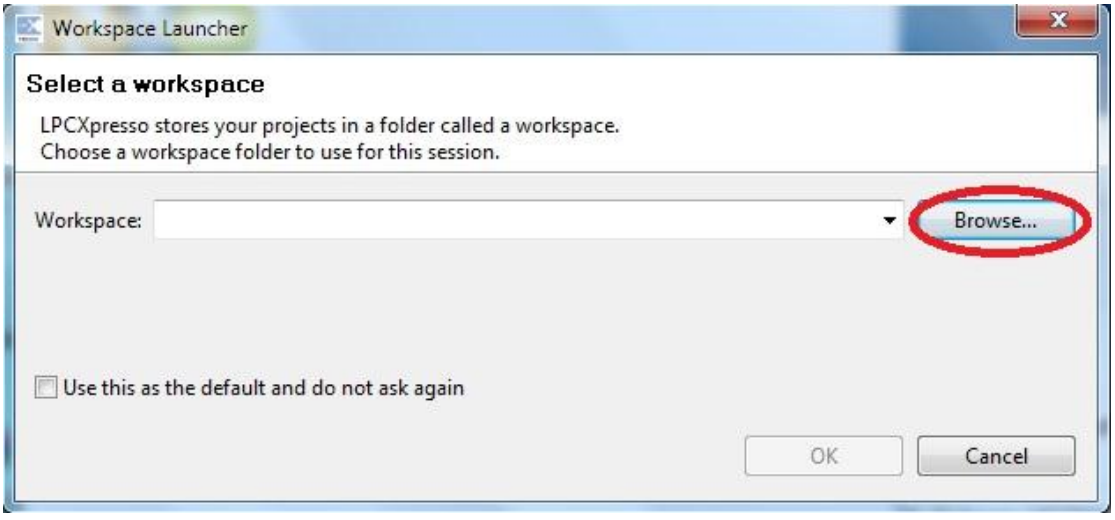
Workspace Launcher
Select a workspace
LPCXpresso stores your projects in a folder called a workspace.
Choose a workspace folder to use for this session.
Workspace:
Browse...
Use this as the default and do not ask again
OK
Cancel

Fig.16

Step 3: Please select LPC1768-Xplorer_Examples_V1 folder which downloaded from website, as shown below image and click OK as shown in below image.

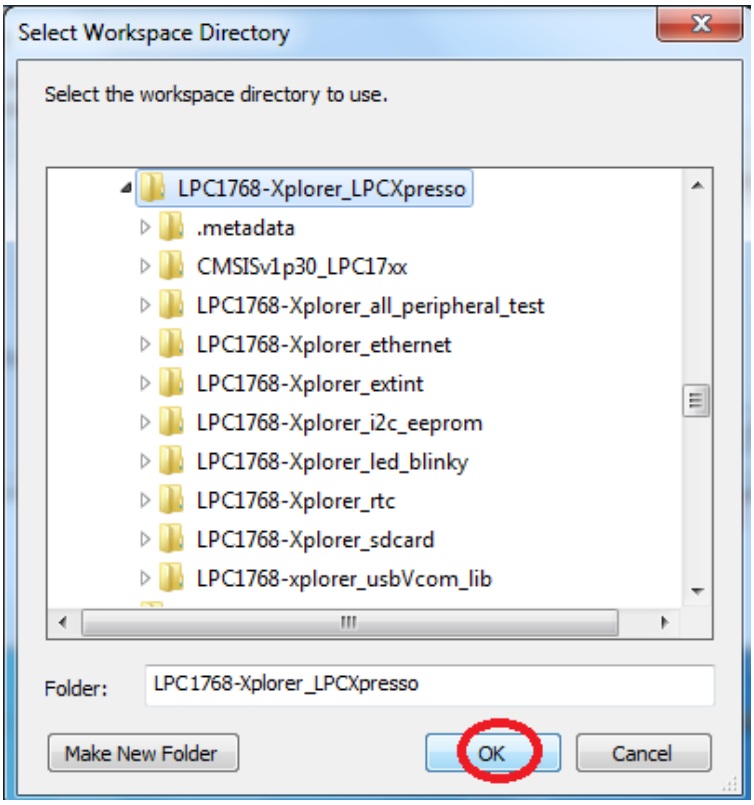

Fig.17

Step 4: Click OK.

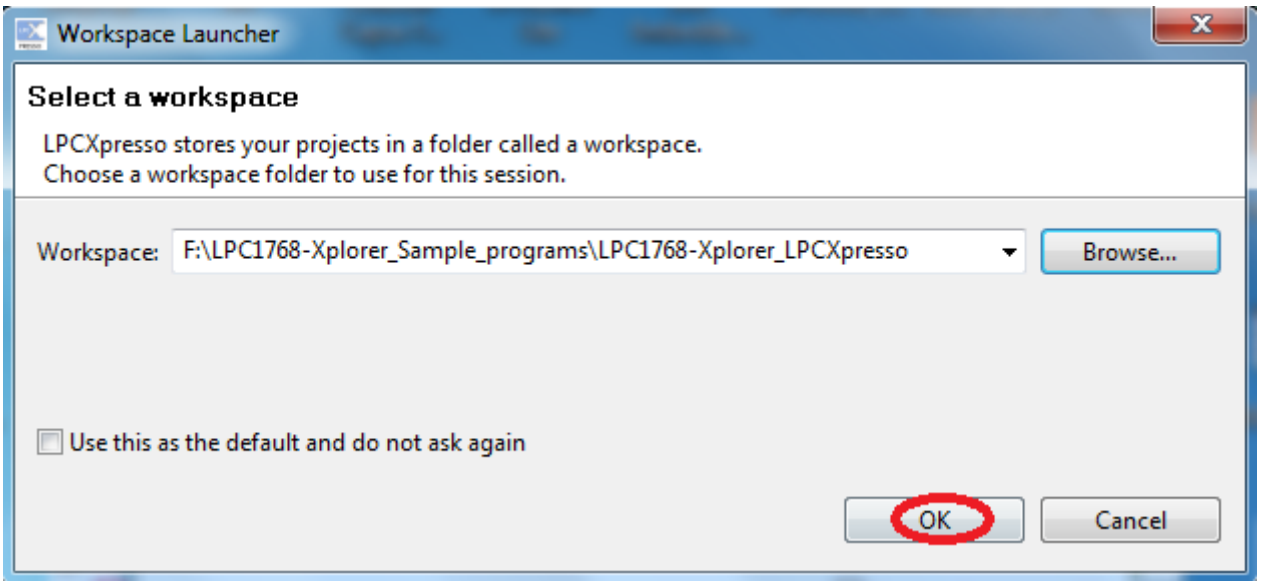

Fig.18

Step 5: Click on File -> New -> Project… as shown below image.

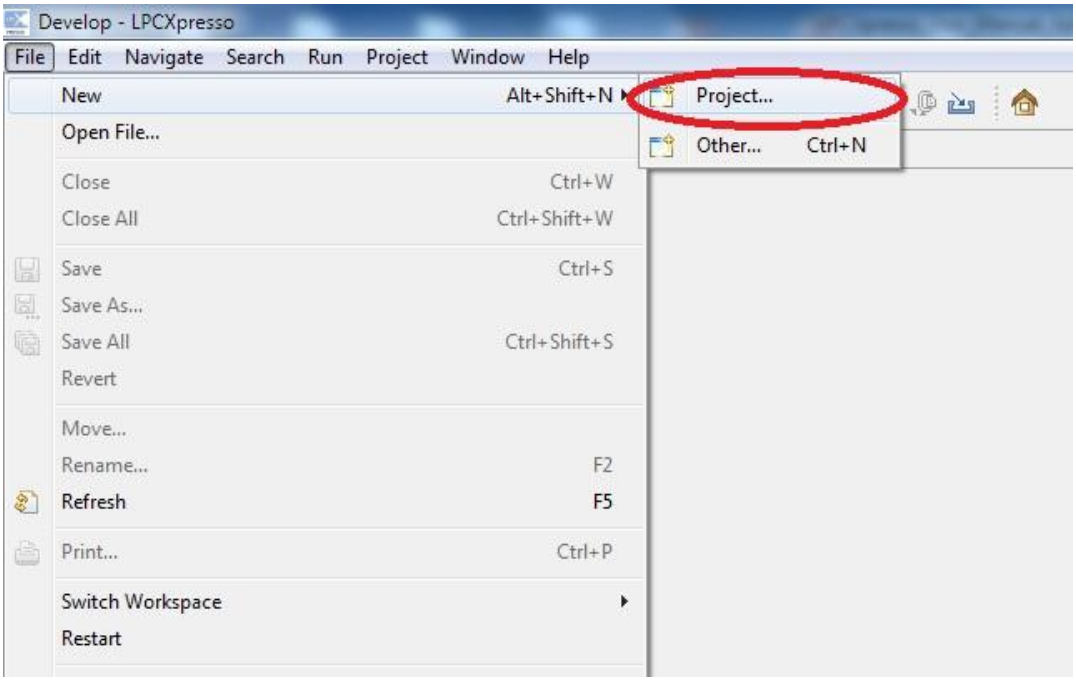

Fig.19

Step 6: Select LPCXpresso C Project and Click Next as shown below image.

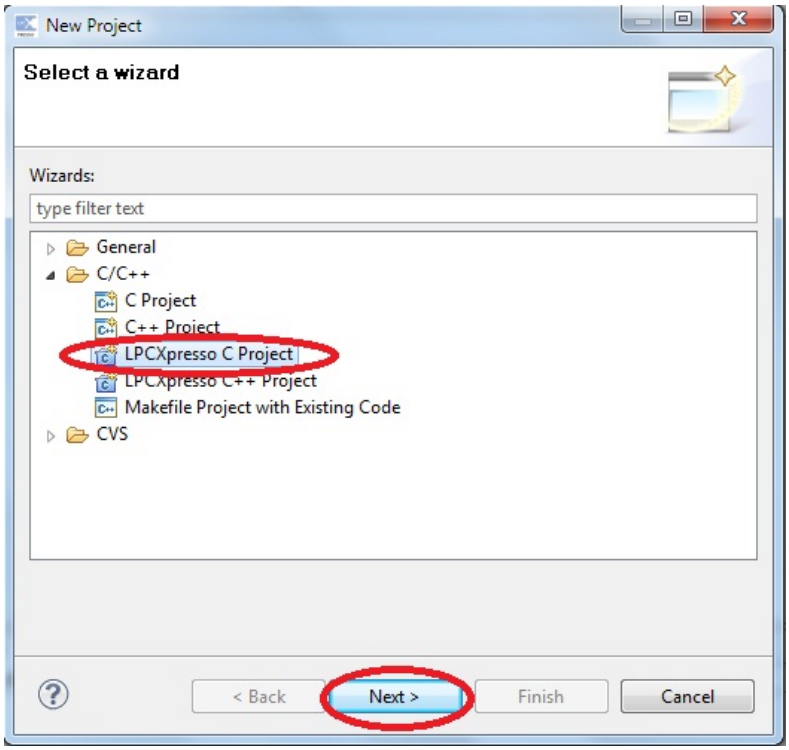

Fig.20

Step 7: Select NXP LPC1700 projects -> C Project and click Next as shown below image.

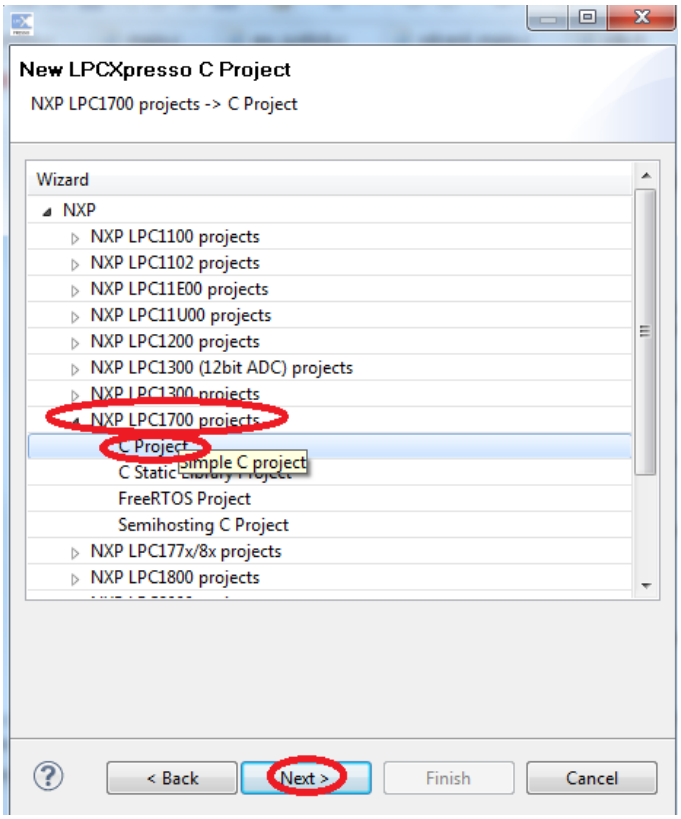

Fig.21

Step 8: Give Project name is Blinky and Click Next.

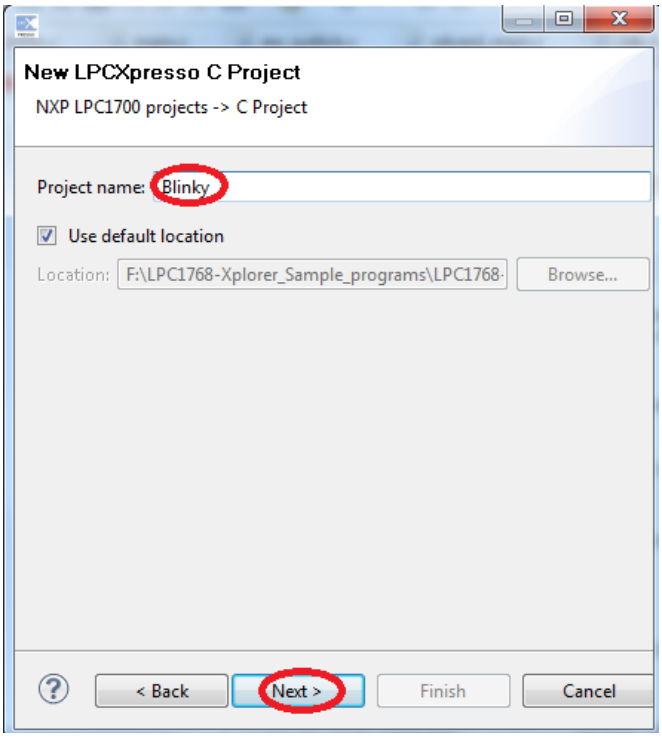

Fig.22

Step 9: Select the target MCU is LPC1768 and click Next as shown in below image.

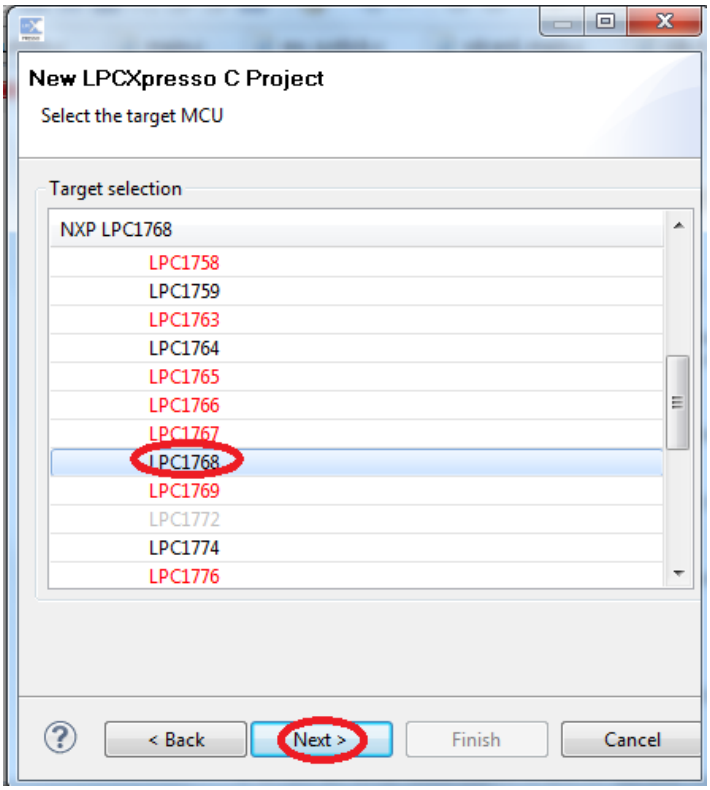

Fig.23

Step 10: Click Finish.

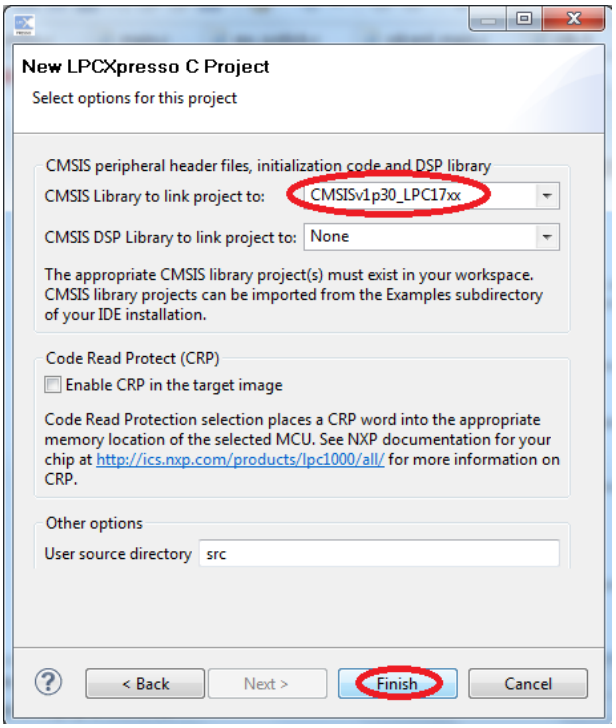
New LPCXpresso C Project
Select options for this project
CMSIS peripheral header files, initialization code and DSP library
CMSIS Library to link project to:
CMSISv1p30_LPC17xx
CMSIS DSP Library to link project to:
None
The appropriate CMSIS library project(s) must exist in your workspace. CMSIS library projects can be imported from the Examples subdirectory of your IDE installation.
Code Read Protect (CRP)
Enable CRP in the target image
Code Read Protection selection places a CRP word into the appropriate memory location of the selected MCU. See NXP documentation for your chip at http://ics.nxp.com/products/lpc1000/all/ for more information on CRP.
Other options
User source directory
src
< Back
Next >
Finish
Cancel

Fig.24

Step 11: The New Blinky Project is created, double click on main.c file as shown below image.

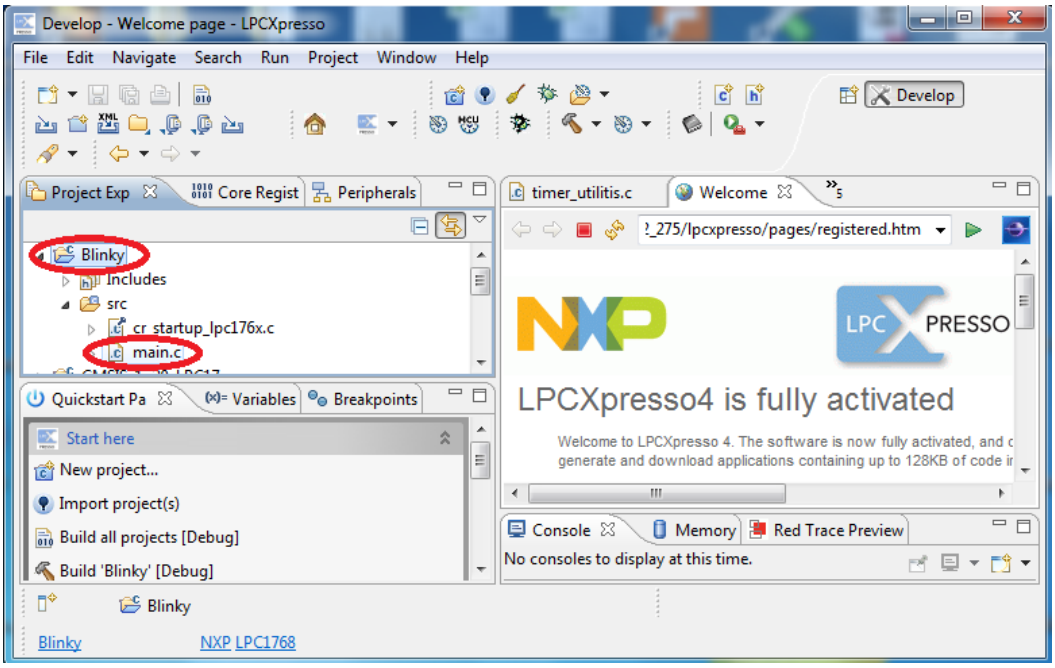

Fig.25

Step 12: After double click the main.c file will open in LPCXpresso as shown in below image

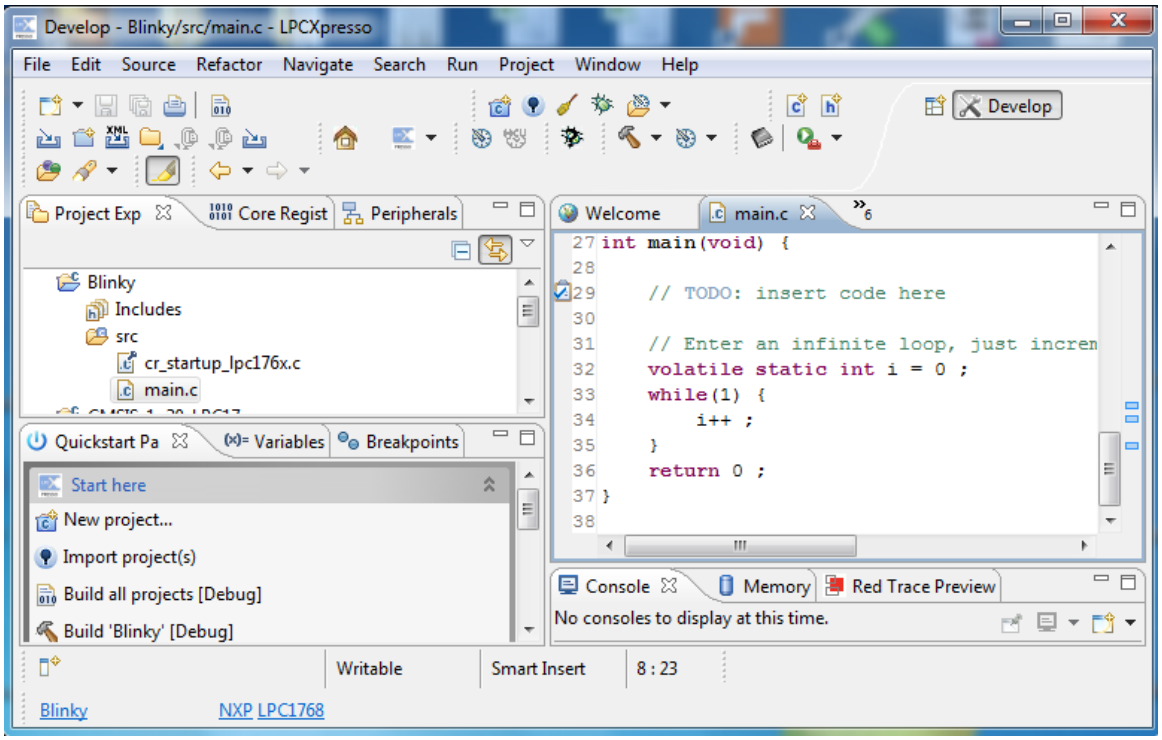

Fig.26

Step 13: Write a C program for LED blinky, after the program Click on Save as shown in below image.
(Note: Writing a C code for Blinky project Please refer Downloaded LPC1768-Xplorer_led_blinky example)

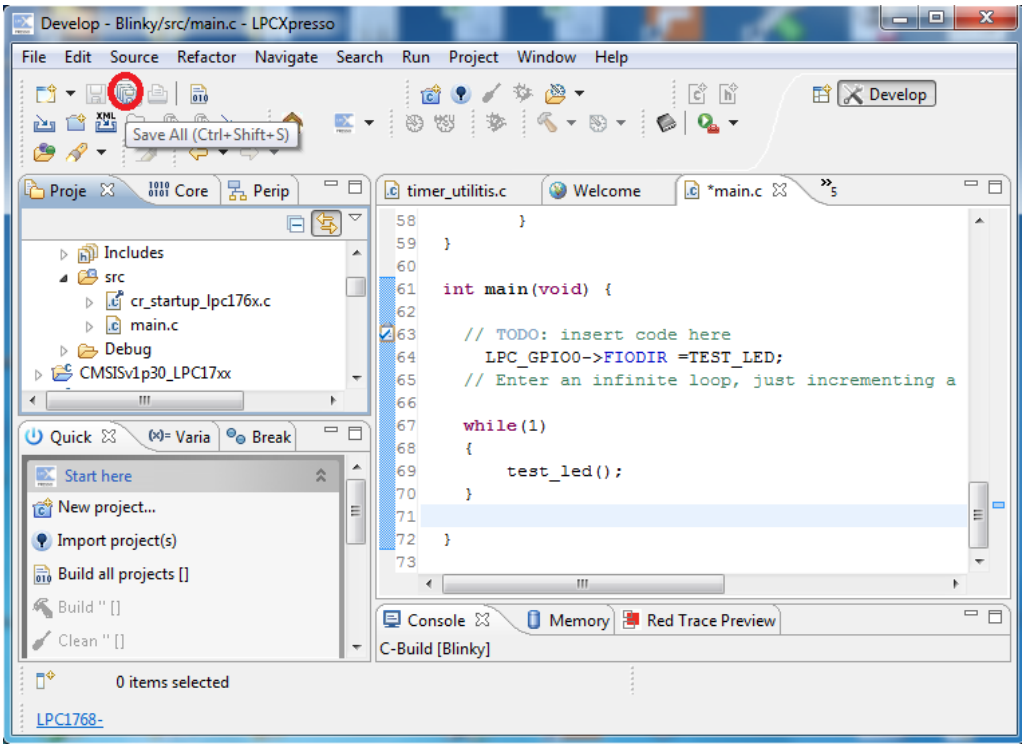

Fig.27

Step 14: To include LPC17xx.h file in your project right click on your Project and click on Properties.

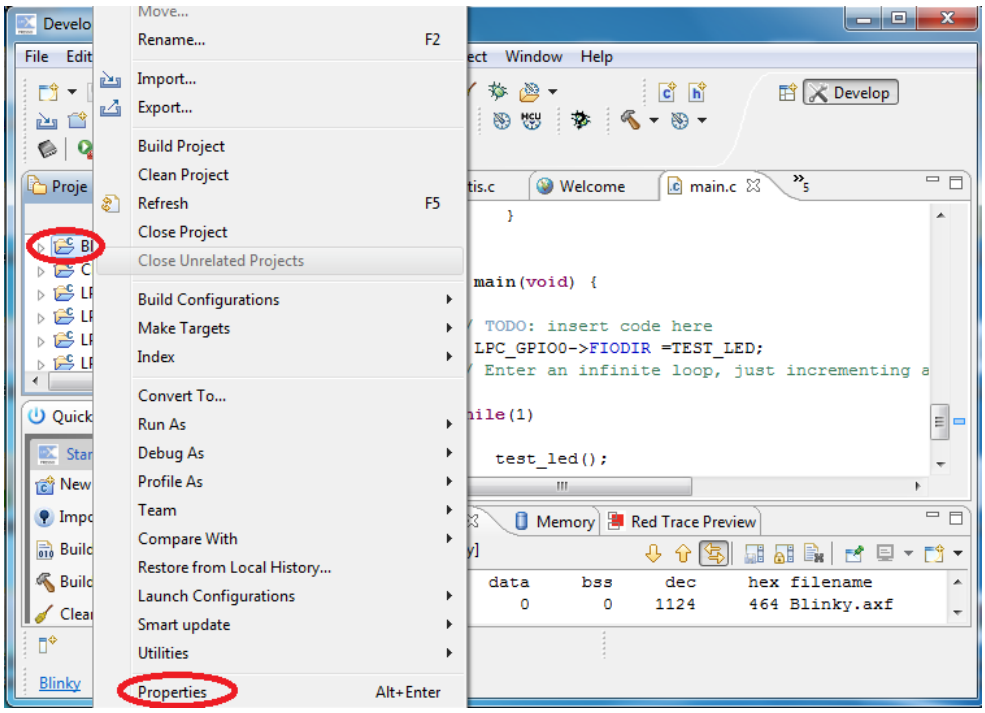

Fig.28

Step 15: Select C/C++ Build ->Settings then Includes, click on Add then click on workspace to select the .h files path as shown below image.

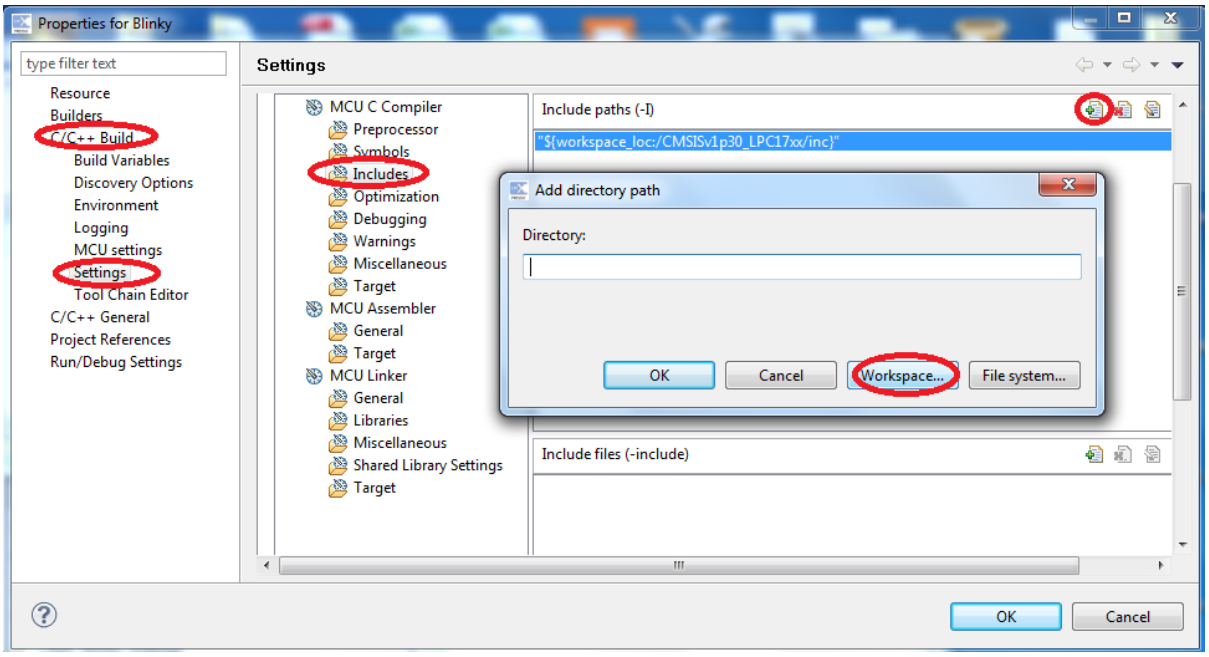

Fig.29

Step 16: Select LPC17xx.h file path then click OK as shown below image.

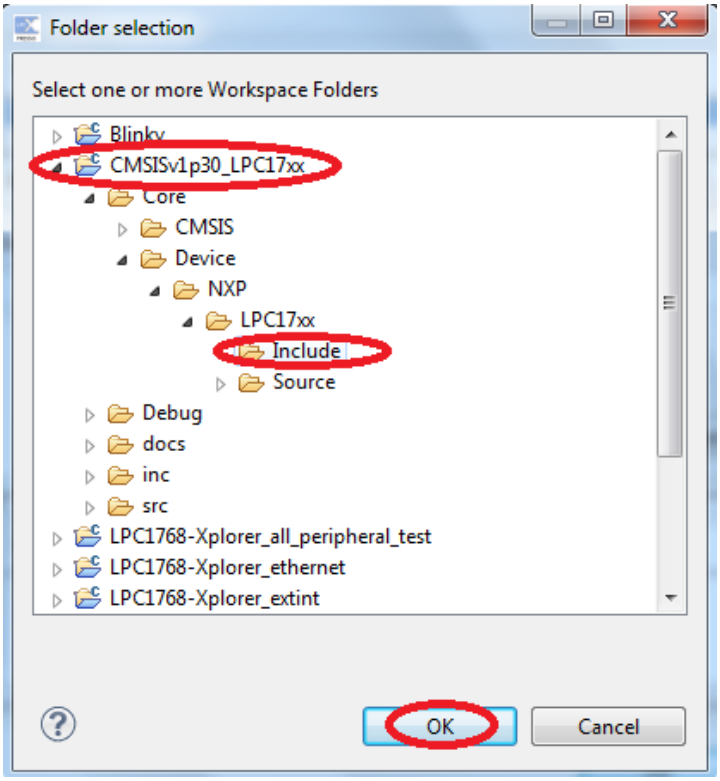

Fig.30

Step 17: Click OK and OK as shown below image.

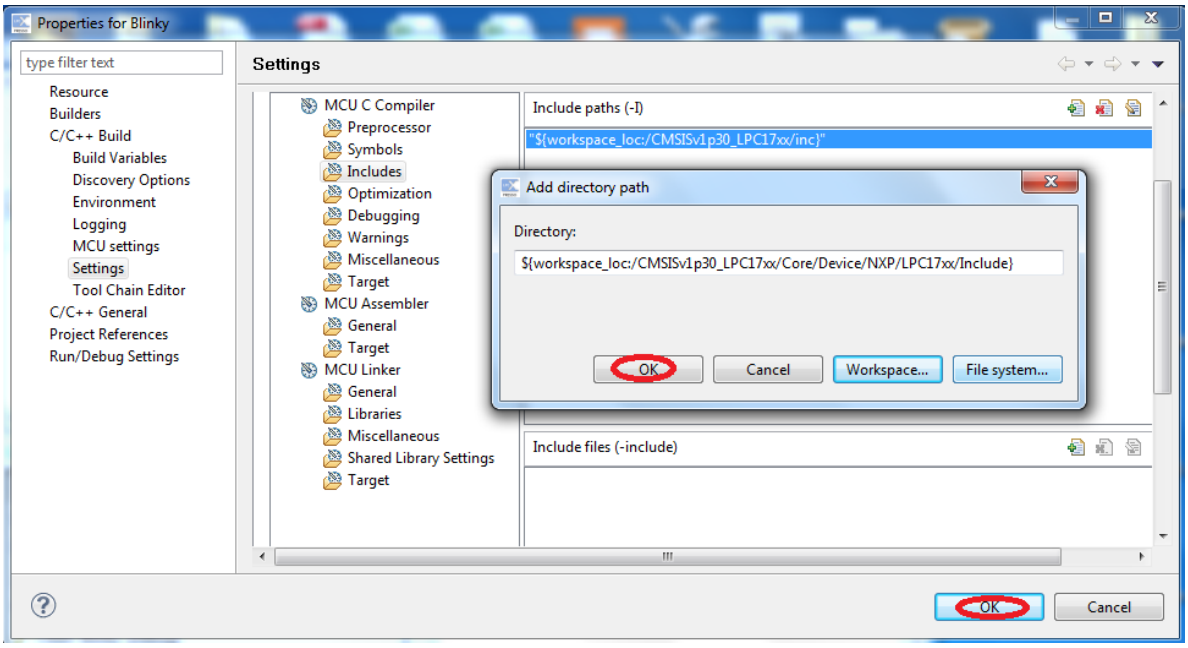

Fig.31

Step 18: Right Click on Blinky Project and click on Build Project, build must be error free.

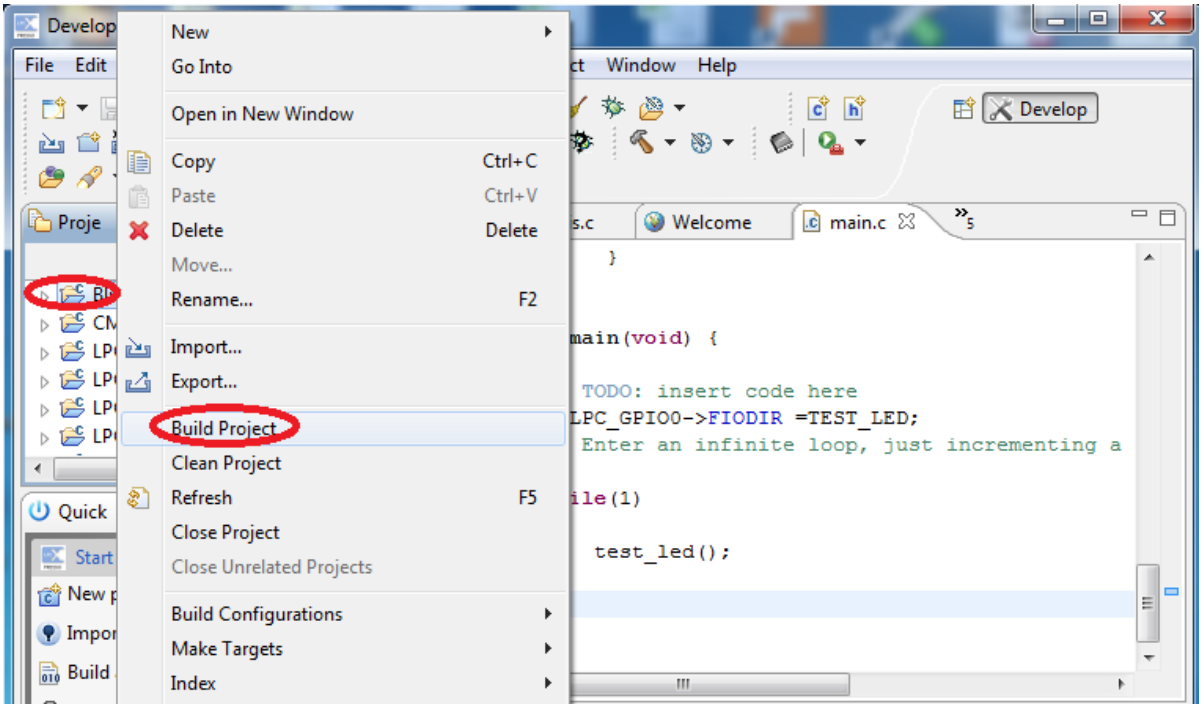

Fig.32

Step 19: After successful build, click on Debug as shown in below image

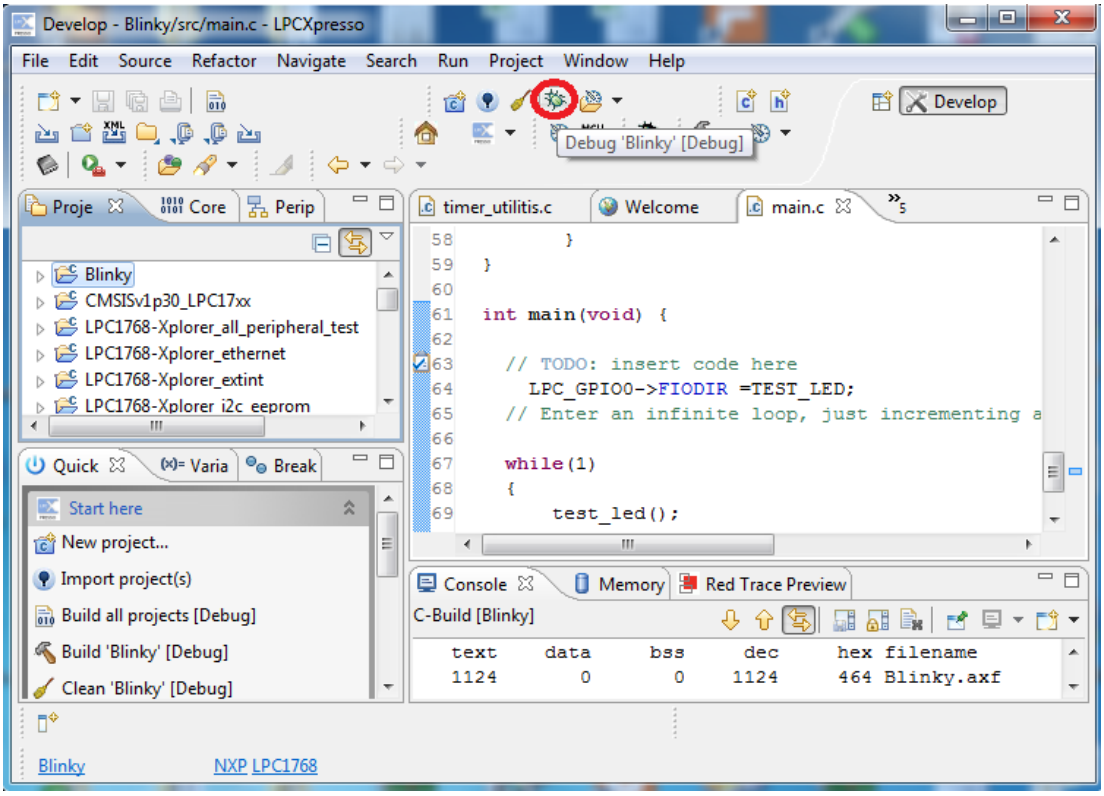

Fig.33

Step 20: Click Resume for free running, the LED D4 is starts blinking on LPC1768-Xplorer.

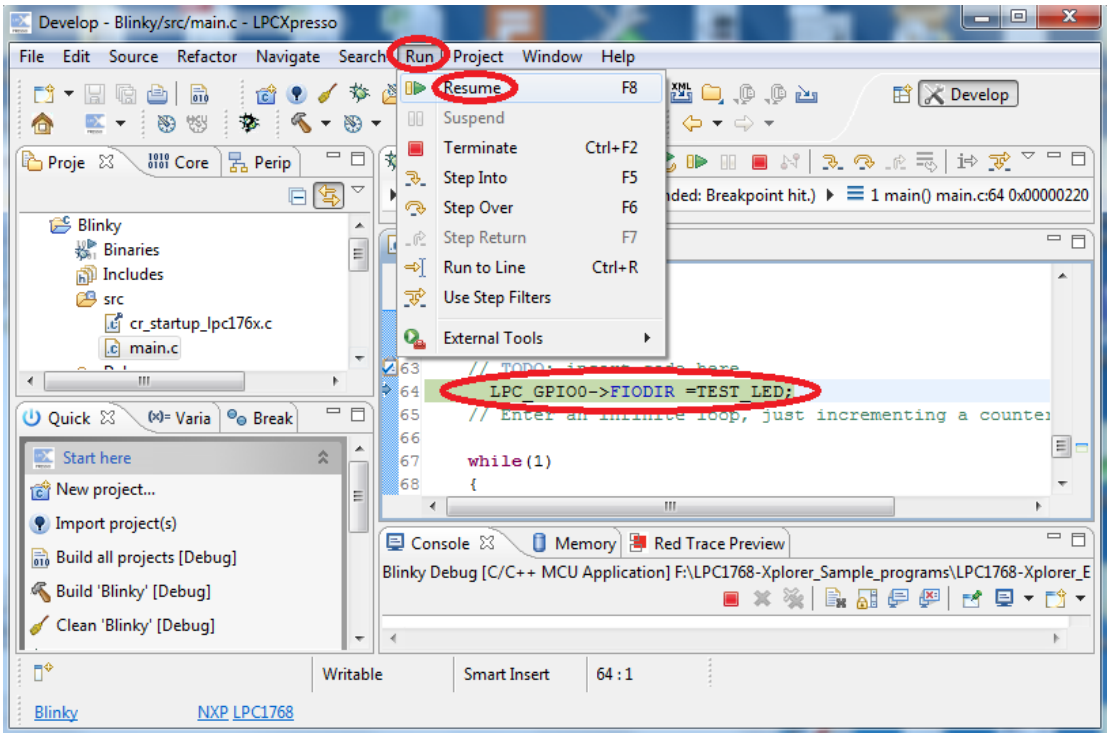

Fig.34

4.0 LPC1768-Xplorer Programming

4.1 Programming options

LPC1768-Xplorer can be programmed using the

- Secondary USB bootloader (USB)
- Debugger (NXP LPC-LINK)

4.1.1 Secondary bootloader (USB)

In order to program the board through USB we need to get the board under programming mode.

Getting the board in programming mode:

Theory: The secondary bootloader looks for a logic LOW to be present on a pre-defined PIN (ISP pin) during reset. If the ISP pin is held LOW and reset signal is provided to the MCU, the MCU enters into programming mode.

Practical:
On the LPC1768-Xplorer the RESET and ISP signals are connected to buttons provided on the board. Look for the RESET and ISP marking on the board. Therefore to enter into programming mode:

- **Press and hold** the ISP button
- Press the RESET button and release it
- Now release the ISP button
- The board is in the programming mode

Programming through USB is the most convenient way to program the LPC1768-Xplorer. The USB bootloader makes programming the board very simple. You don't require any PC application to program using USB bootloader. Once the board enters the programming mode it appears as a drive on your Windows machine and all you need to do is just drag-n-drop your binary to this drive.

4.1.2 Flashing the board using USB

The pre-build binaries can be used to flashing onto to the board for each peripheral by using the USB bootloader as a Mass storage device. After loading the USB bootloader firmware to the LPC1768-Xplorer board, Press ISP, then RESET; release RESET, then ISP, the mass storage device will appear on your screen. On the board LED D3 glows. Remove firmware.bin file and then place your bin file and then press reset switch to execute the specific code written on to the flash.

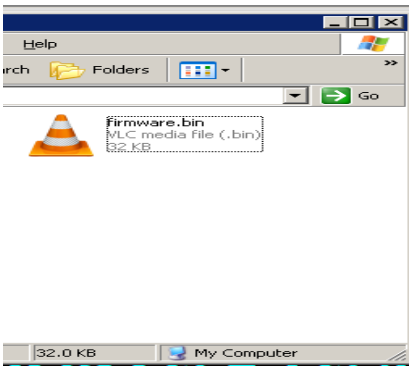

Fig. 35

Flashing the bin file(Drag & drop).

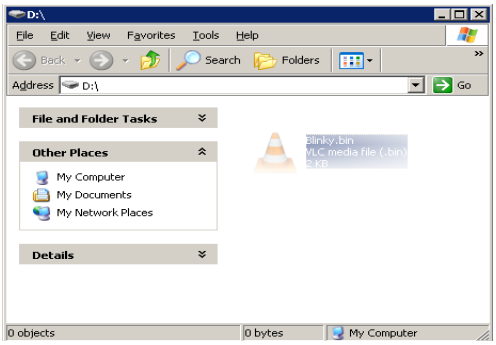

Fig. 36

5.0 Restoring LPC1768-Xplorer to Factory Defaults

5.1 LPC-link and LPCXpresso

To restore the factory defaults for the Xplorer, the user needs the LPC-link to flash **LPC1768-Xplorer_all_peripheral_test.bin** file in LPCXpresso.

Steps to restore the factory defaults for Xplorer:

Step 1: Open LPCXpresso, Import the **LPC1768-Xplorer_LPCXpresso.zip**, as explained above in the *section 3.1*. Click on the **program flash.**

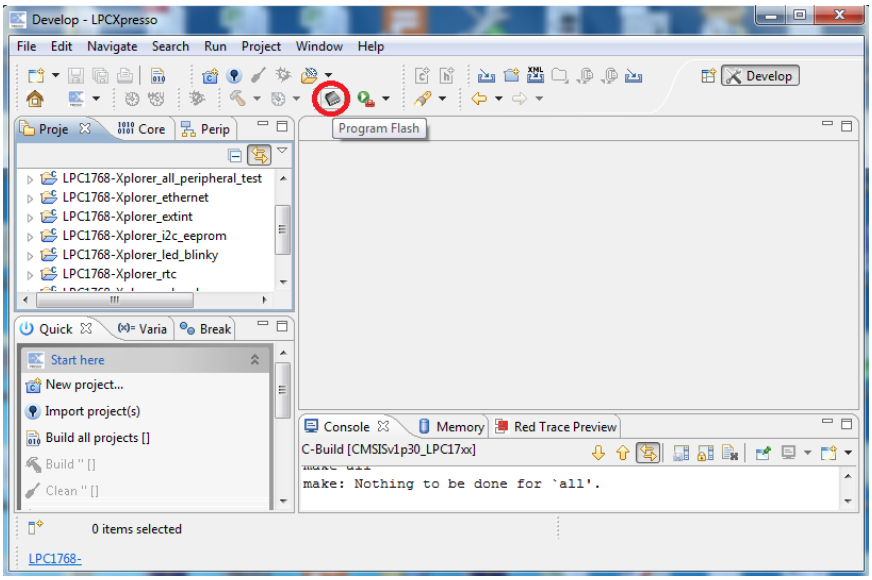

Fig.37

Step 2: Click on Browse.

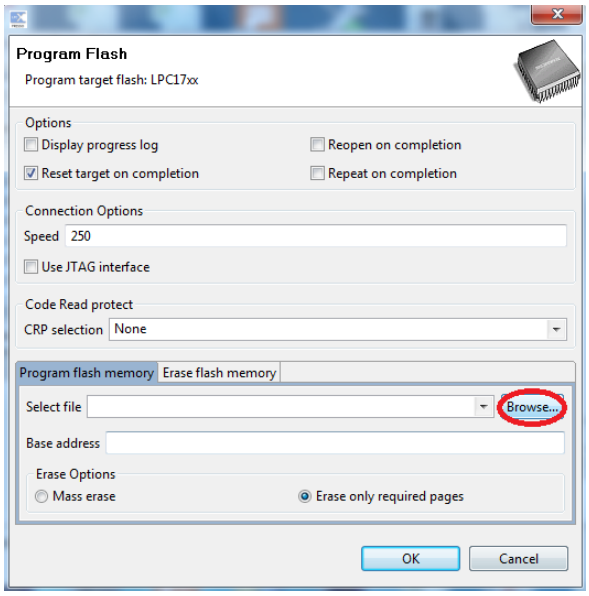

Fig.38

Step 3: Select *.bin and then select the following path..**\Binaries\LPCXpresso\Bin\LPC1768-Xplorer_all_peripheral_test.bin** and click open.

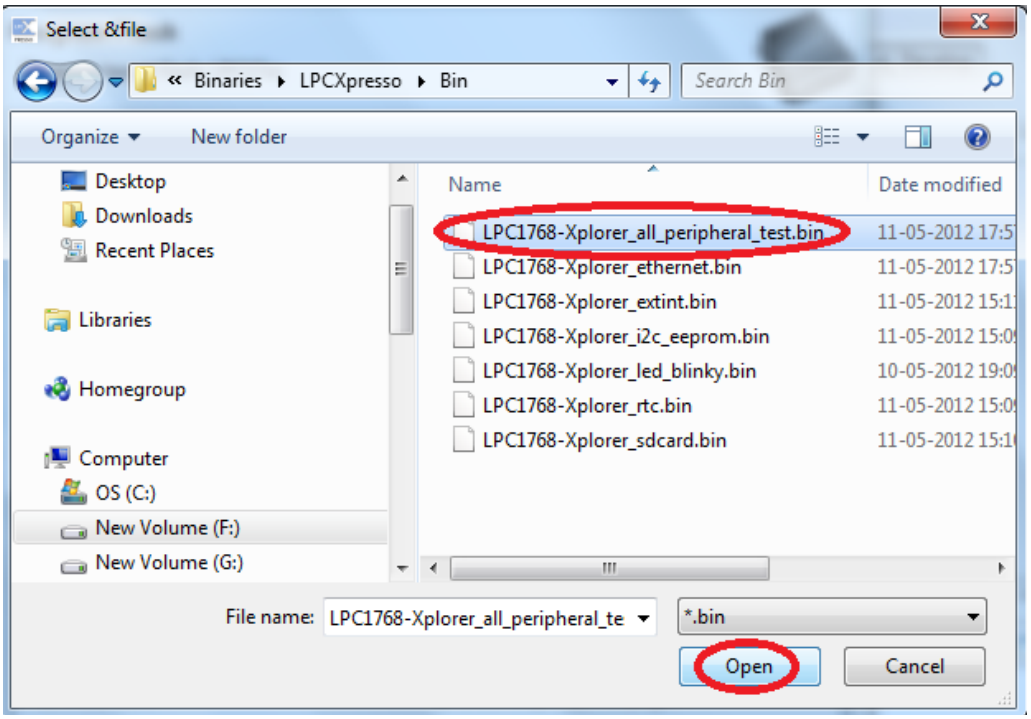

Fig.39

Step 4: click OK.

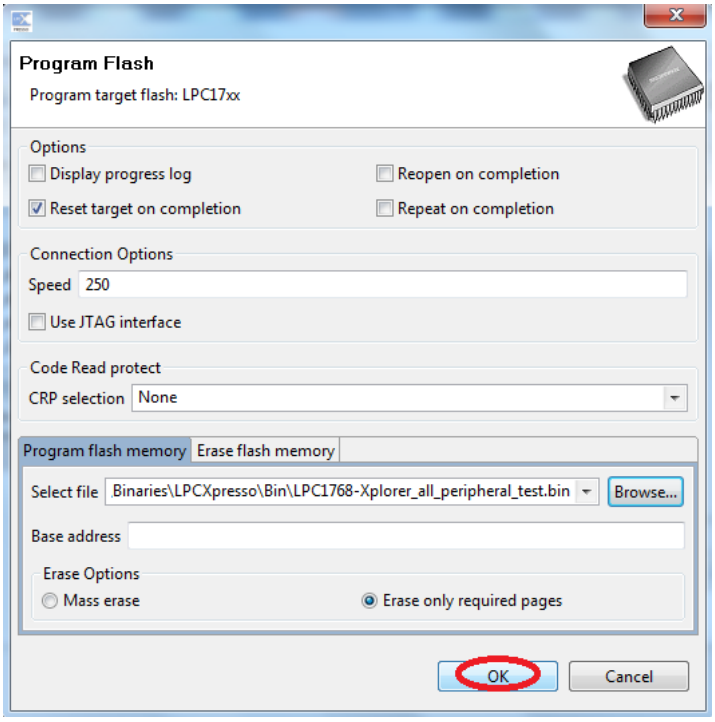

Fig.40

Step 5: Wait till the download process is completed then RESET the Xplorer, to restore the Xplorer to factory defaults.

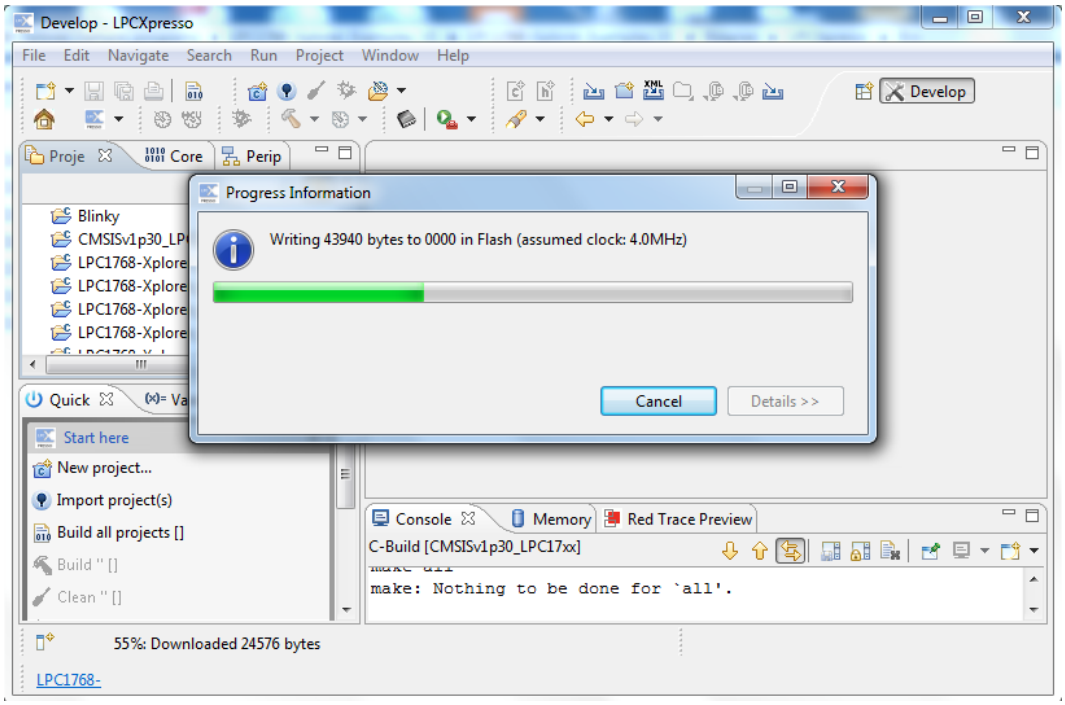

Fig.41

The same way we can flash the any bin file to the target board.

6.0 Schematic & Board Layout

6.1 Schematic

This manual will be periodically updated, but for the latest documentations please check our website for the latest documents. The Board schematic and sample code are available after the product has been registered on our website.

6.2 Board layout

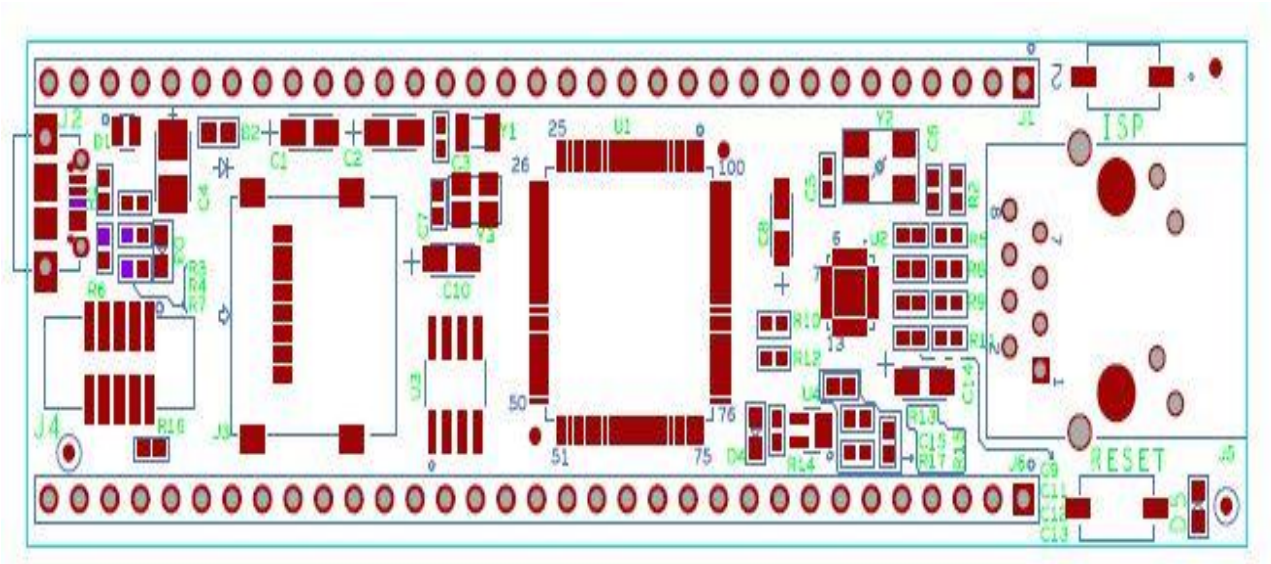

Fig.42

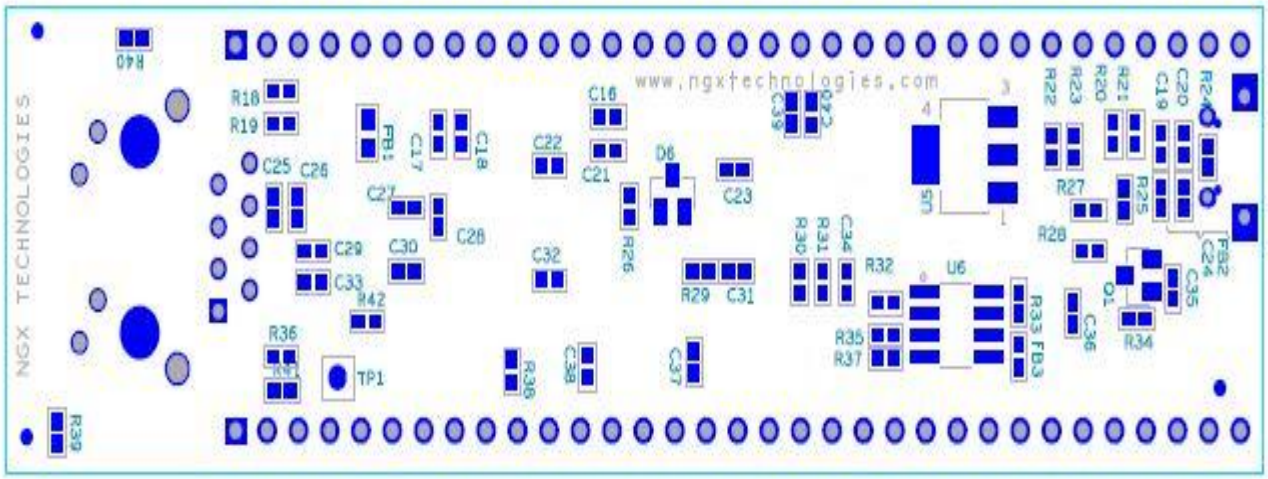

Fig. 43

参考資料

7.0 CHANGE HISTORY

7.1 Change History

Rev	Changes	Date (dd/mm/yy)	By
1.0	Initial release of the manual	25/06/2012	Veeresh Tumbaragi

参考資料

About this document:

Revision History

Version: V1.0 author: Veeresh Tumbaragi

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